THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
MARINE RESOURCES OPERATIONS

REPORT FOR THE MONTH OF MAY 1963

Albacore Outlook

Present ocean conditions indicate that the main body of albacore will migrate into our fishing grounds through an area delineated by lat. 31°N. and 33°N.

Again this year, we expect poor fishing success in the once heavily productive Guadalupe Island area. We do not know how many albacore will travel within reach of sportfishermen, but since this season is shaping up about like last year we anticipate good sport fishing.

1963 Pre-season Albacore Cruise

This annual cruise is being conducted jointly with the U.S. Bureau of Commercial Fisheries. The N.B. SCOFIELD departed May 23, and will return June 21. The BLACK DOUGLAS left May 28, and will return July 2.

The survey area extends from Guadalupe Island, Baja California northward to San Francisco and offshore some 500 miles. A major objective is to intercept the incoming albacore schools and study their coastward migration route, in relation to the oceanic environment.

At the last report on 29 May, the SCOFIELD was about 300 miles due west of Morro Bay. She was in 60° water (the right temperature for albacore) but had caught no fish so far.

Bluefin Tuna

The Inter-American Tropical Tuna Commission has announced recovery of a tagged bluefin off Japan which was released at Guadalupe Island five years ago. This first trans-Pacific record for this species confirms the suspicions of tuna biologists that bluefin indeed moved across the ocean. Interestingly, IATTC is not studying this species; the fish was one of only 121 bluefin marked fortuitously in the course of a yellowfin-skipjack cruise. This significant recovery highlights the importance of sea-going biologists seizing every opportunity to contribute to science when the unexpected occurs. (See Chatwin and Orange, Calif. Fish and Game, 1960, vol. 46, p. 107-109).

Sportfishing

Compilation of April party boat records showed big increases over March for several key species. Kelp bass, barracuda, halibut and salmon all rose more

than 200 percent while yellowtail was up 650%. Compared to April 1962, barracuda, halibut and salmon were up appreciably, yellowtail up slightly, and kelp bass down slightly.

Abalone

Keith Cox, Marine Biologist II, had the opportunity while in Japan on oyster inspections last March to visit several laboratories at which abalone are being reared. He reports that techniques for inducing spawning, collecting and rearing larvae, and raising the young are generally the same and appear successful. The Japanese are convinced that abalones can be raised on a commercial basis and are attempting to do so this year.

Ocean Shrimp

The season got off to a slow start because of a price dispute, finally resolved at ten cents a pound. Eight boats are now fishing in Area A (Eureka-Crescent City); seven of them are using the newly-legalized otter trawl.

Publications

Fish Bulletin 121, The California Marine Fish Catch for 1961, was received from the printer. Total commercial landings and shipments reached 725 million pounds, about the same level as recent years. Value of the catch to fishermen was $74 million. Yellowfin tuna led in pounds and value, followed by jack mackerel, skipjack and albacore in poundage and by albacore, skipjack and salmon in value. In 1960 the same rankings prevailed.

The bulletin contains an article by E.A. Best delineating catch localities for Dover sole 1950-59.

Fishing Notes

Price disputes kept the northern California trawl fleet tied up from 1 to 18 May.

May saw the first landings in a year of whole fish for use as animal food.

Mackerel landings for 1963 are running about 3,000 tons ahead of last year's at this time.

1. BOTTOMFISH

A. Flatfish: The northern California trawl fleet was tied up from May 1 to 18 to discuss price for the summer season; this drastically reduced landings.

Good Dover sole fishing was reported late in April and from the first trips after settlement of the price in May. San Francisco had fair to good landings of petrale from the Point Arena area late in May.

B. Rockfish: Landings have been light at all ports. Small chilipepper have appeared in abundance at all ports from Santa Barbara to Fort Bragg. This may be the first indication of a large incoming year class.

First landings of whole fish for animal food since May, 1962, were made in northern California. Fishermen were required to sort out sablefish and the price remained at two cents per pound. There is some uncertainty as to how long the processors will continue to buy fish for this market.

A report on the "Status of the California Bottomfish Fishery" was prepared and forwarded to Pacific Marine Fisheries Commission for presentation at State Department hearings in Washington, D.C.

A manuscript, "Movements of Petrale Sole Tagged off California", was completed and submitted for publication in the forthcoming 1963 PMFC Bulletin.

2. SHELLFISH

A. Abalone: Through the cooperation of Dr. Takashi Ino, Chief of Biological Research, Ministry of Fisheries and Agriculture, of the Japanese Central Government, Keith Cox visited several laboratories where abalone are being reared.

At Tohoku University Sabusawa Laboratory in Matsushima Bay, young abalone after reaching the crawling stage are placed in cement tanks until they are large enough to be planted in natural habitat. Approximately 10,000 young abalone are now being held in the tanks.

At the Konozawa Shellfish Laboratory at Kesannuma, (approximately 90 miles north of Sabusawa) almost all work is on abalone and is financed by commercial fishing interests. Young abalone are raised in floating plastic tanks, each holding approximately 10,000 young (2-4 mm in diameter).

These abalone are fed on a diet of Monas reared at the laboratory.

At the Ministry of Fisheries and Agriculture Laboratory at Tsukushima, Tokyo, Dr. Ino has developed methods for rearing larval stages in aquaria with special attention to influences of temperature and diet.

At Shimoda, on the Izu peninsula in addition to abalone, puffer fish

and lobsters are being reared in separate but similar shallow cement tanks. Methods used to induce spawning and rear the larvae are approximately the same as those in the other laboratories.

The Tateyama Marine Laboratory at Tateyama on the Chiba peninsula is part of the Fisheries High School system. Here abalone are also being reared in cement tanks where they are placed after the larval stages. Methods at this laboratory are similar to those at Shimoda. Lobsters are also being reared here.

The Kominata Laboratory on the Chiba peninsula, near the fishing port of Kominata, is where Dr. Ino did his first work on rearing abalone. At this laboratory the research is programmed to determine species of food algae which will induce abalones to grow most rapidly to large size and be in good condition.

Although the method for inducing spawning of adults, collecting and rearing larvae, and raising the young abalones is generally the same, at each laboratory differences in various phases of the technique are employed. For example, the larvae are not fed at Sabusawa, while at Konozawa considerable effort is placed on culturing special diets specifically for the larval stages.

This year represents the first attempt by the Japanese to rear abalone on a commercial basis. Previous work of pilot plants has convinced them that abalones can be reared on a commercial basis.

B. Crab: Late season landings continued to decline in both the Eureka and San Francisco areas.

Growth sampling continued aboard the NAUTILUS. Sixty crabs were tagged with a plastic suture tag to begin a suture tagging program. In June and July we hope to tag 2,500 additional male crabs 130 millimeter and larger in shoulder width. The new suture tag should answer some of the questions on rate of growth with which we are confronted in our life history studies.

Another tag was recovered from the Eureka-Crescent City area. To date, 506 or 56 percent of 901 tags have been recovered.

C. Oysters and Clams: Statewide oyster opening operations declined from previous months. The demand is not as high and the oysters are rapidly approaching spawning conditions.

Trapping in Humboldt Bay has failed to yield bat rays so far this year.

A tour of Drakes Bay revealed noticeable red and rock crab damage to 1961 year class oysters.

Heavy silting in Tomales Bay appears to have caused heavy mortality on this year's oyster seed.

Television station KRON, San Francisco, filmed oyster culturing and harvesting operations at Tomales Bay Oyster Company on May 11. Also in-

cluded in the shooting was the Shellfish Investigation's hanging cultch and ground plot experiments. Dahlstrom was in attendance. The filming will be shown on the program entitled "Bay Region Report" in the near future.

D. Shrimp: Area A (Eureka - Crescent City)

A price dispute tied up the fleet for several weeks. A ten cent per pound price agreement was reached and eight vessels made catches of slightly more than 500 pounds per hour. All but one of the vessels are using otter trawls.

Landings were sampled at Eureka. The catch composition is similar to that encountered aboard the R.V. ALASKA. Age group II shrimp dominated.

Area B-2 (Bodega Bay)

Shrimp were located by fishermen in about 40 fathoms off the Russian River on May 13. It is felt that during the Department's survey in April the shrimp were in more shallow water off the Russian River.

Catches ran from slightly over 2,000 pounds to a little less than 500 pounds per hour for the first two weeks of fishing. Heads-on counts ranged from 159 to 107 per pound and averaged 136. Age Group I shrimp comprised 52.5 percent of the catch while 47.5 percent were age group II and only a trace were age group III shrimp.

Area C

One vessel fished Area C, but mechanical difficulties hampered his efforts and only 200 pounds were landed. The vessel then returned to San Francisco.

3. PELAGIC FISH

A. Sardines: Fish market landings were 81 tons, netted in mackerel catches off San Pedro Bank. The percentage of sardines in individual loads was, on the average, small with less than five percent sardine, but one 50-ton load consisted of about 40 percent sardines. These were large fish, ranging from about 220 to 260 mm body length and were used for a special cannery pack.

B. Mackerel: Catches of jack and Pacific mackerel were netted off San Pedro Bank, San Clemente Island, and Cortez Bank. Through 27 May cannery landings consisted of 2,800 tons of Pacifics and 3,100 tons of jacks. Small amounts went to the markets. Combined landings for both species are running about 3,000 tons ahead of those of last year at this time.

About 250 tons of jacks were processed at Moss Landing.

C. Anchovies: San Pedro fresh fish market landings were negligible with only 1 ton received.

D. Miscellaneous: About 600 tons of squid were canned at Monterey and 50 tons of squid and 25 tons of herring were processed at Moss Landing.

E. Live Bait: Live bait was comparatively easy to get and almost all live bait boats were working.

F. Aerial Survey: The inshore area from the U.S. - Mexican Border to Fort Bragg was surveyed 13-15 May. Fifty-seven anchovy schools were observed between Pt. Sur and Piedras Blancas. Fish schools seldom are sighted in this area.

Anchovy school groups were extensive off southern California. One group extended continuously from Gaviota to Rincon Point. One school in Santa Monica Bay extended from Santa Monica pier to Playa del Rey, a distance of 4 miles.

In summary, 87 anchovy schools were observed north of Point Conception and 495 south.

G. Sea Survey: The ALASKA departed May 10 for northern California waters to survey the fish and invertebrates in the pelagic environment and to attempt to obtain live sardines for blood genetic and morphometric studies. On May 24 a report from the ALASKA indicated that 20 trawl tows and 15 night-light stations had been made. Small salmon (122-264 mm) have been netted on four trawl tows. Twelve were netted in one tow off Fort Bragg and 5 of these were marked with an adipose-right maxillary clip.

4. TUNA

A. Albacore: The N.B. SCOFIELD is in albacore land, seeking leaders of the coming season's "run" and making routine oceanographical and biological observations. In addition, weather data will be recorded every six hours and transmitted to the U.S. Weather Bureau.

The 1963 Albacore News Letter is nearing completion and will be mailed to cooperating fishermen before the season begins. Present ocean conditions indicate that the main body of albacore will migrate into our fishing grounds through an area delineated by lat. 31°N. and 33°N.

Again this year, we expect poor fishing success in the once heavily productive Guadalupe Island area. We do not know how many albacore will travel within reach of sportfishermen, but since this season is shaping up about like last year we anticipate good sport fishing.

Preparation of the forthcoming catch publication continued as time permitted.

B. Bluefin: Two landings of bluefin tuna were made this month. One landing of 74 tons was of fish caught in April, the other of 98 tons was caught in May. One bluefin from the April catch had been tagged last summer off San Clemente Island some 225 miles north of where it was recaptured, near Guadalupe Island. The Inter-American Tropical Tuna

Commission reported that a bluefin tuna tagged February 2, 1958 off Guadalupe Island was recaptured April 23, 1963 near the Bonin Islands south of Japan. This is the first trans-Pacific recovery of bluefin tuna.

Troubles in the tuna market are affecting prices to fishermen. The price for bluefin tuna is down 23%. Last year at this time canners paid $300 per ton, today the price is $230 per ton ex vessel.

5. SPORTFISH

A. Party Boat: During April 34,517 anglers on 190 party boats landed an average of five fish each. April catches of some species were considerably larger than the March take. Kelp bass landings increased 260 percent, barracuda 212 percent, California halibut 245 percent, salmon 200 percent and yellowtail 650 percent.

Party boat logs showed the following totals through April:

THROUGH APRIL	1963	1962
Rockfish	249,736	211,338
Kelp and Sand Bass	72,516	46,788
Bonito	78,517	74,052
Barracuda	44,220	46,245
California Halibut	31,298	24,009
Salmon	18,525	15,576
Yellowtail	1,335	1,196
Striped Bass	3,071	3,949

During the month, 16 man days were spent in field work to secure improved party boat logs. Skippers were contacted at San Clemente, Newport, Seal Beach, Long Beach, Morro Bay, Avila, Monterey, and Princeton.

The galley proof of Fish Bulletin 122 (Kelp Bass) was edited and a report was submitted to the Marine Resources Manager on the near and long term plans for the sportfish investigation.

B. Ocean Fish Habitat Development (DJ F17R6): During the month, field work on the artificial reefs was limited to a few short survey dives. Most of the time was spent in boat and gear maintenance, analysis of data, identification of invertebrates, and attending the Department's Diving Seminar at Lake Tahoe.

The divers made test dives with underwater communications equipment manufactured by Celestronics Inc., on 10 May and surveyed the Signal Oil Co. oil drilling platform, Huntington Beach on 27 May.

A male and an ovigerous female of the commensal shrimp, Pontonia californiensis, were taken at Santa Catalina Island by project divers. These shrimp are found inside the tunicate Ascidua vermiformis. This was the second pair taken by our divers and the 6th and 7th specimens

on record. The first pair, numbers 4 and 5 -- also a male and an ovigerous female, have been sent to the U.S. National Museum. Prior to this, ovigerous females had not been observed.

C. Blue Rockfish Management Study (DJ F19R2): A successful N.B. SCOFIELD cruise was terminated on May 10 at Terminal Island. Specimens were delivered to three aquaria for serological studies, stomachs were collected for analysis, and tagged fish were released at several locations.

Species composition and length frequencies of blue rockfish and lingcod of the party boat and skiff catches were collected at all ports from Bodega to Avila except for San Francisco Bay ports. Stomach analysis was continued at San Jose State College.

The fishing map for Monterey and San Luis Obispo counties was submitted for editing, as were the sections on party boat fishing, shore fishing and surf netting for the F12R bulletin. The remaining sections on skiff fishing and general summary will be submitted in June.

D. Southern California Marine Sport Fish Survey (DJ F20R1): The pier and jetty sampling plan for May, June, July and August was put into operation on May 1. To sample piers and jetties more thoroughly the following changes in the original plan were made:

1. Piers and jetties were separated into two different strata.

2. The days to be sampled in each stratum were selected independently.

3. The 12-hour fishing day was shifted from 0630-1830 to 0730-1930 to compensate for daylight-savings time and to bring evening fishermen into the sample.

The possibility of collecting biological data on some of the more important species appearing in the sport catch from piers and jetties is being considered. What data can be collected, what methods to use in collecting it, and how it will be used is being investigated.

Techniques and calculations for determining various parameters of the barracuda and white seabass populations in California waters were investigated. Survival and total mortality rates for barracuda were calculated for 1958, 1959 and 1960. Preliminary estimates ranged from 20 to 64 percent for fully recruited year-classes - age six and older. Leslie's method for estimating population size was used in making preliminary determinations for barracuda. Conditional calculations for 1947 indicate a barracuda population in California waters to be between 2.8 and 3.2 million fish.

A modification of Silliman's method for estimating survival rates was applied to 1958, 1959 and 1960 white seabass data. Rough values ranging between 52 and 63 percent were obtained.

Project personnel attended the Greater Los Angeles Council of Divers

championship meet at Leo Carrillo Beach State Park. All fish taken were recorded and measured. An informational letter concerning the data collected has been prepared.

6. SPECIAL PROJECTS

A. Southern California: Data analysis continued on the Los Angeles-Long Beach Harbor pollution study.

May 15 was spent aboard the PROWLER trawling in Santa Monica Bay as part of the Pollution Surveillance Study. Fish samples were worked up.

Checks were made on two sportboats in Santa Monica Bay as part of the artificial reef fishing study, but the reefs were not fished.

Observations indicated greatly decreased concentrations of red water along the coast. One sample of a patchy area off Santa Monica on May 15 showed a count of 363,272 Gonyaulax polyedra per liter, and 90,818 Ceratium tripos per liter.

Two days were spent in Santa Barbara helping coordinate a story and motion picture on wildlife conservation and the oil industry being done for the American Petroleum Institute.

Considerable time was spent in becoming familiar with the duties of Special Projects and the background material relating to the trawl study, seismic, kelp, etc.

B. Northern California: Aplin and Dahlstrom met with Dr. Frank Felice of the biology department of the University of San Francisco on May 7 to discuss mutual assistance on shellfish research. Dahlstrom and Aplin also visited the California Academy of Sciences the same day to confer with several of the staff on technical assistance.

Mr. R. Butler of the Leslie Salt Co. visited the laboratory on May 10 to discuss harvesting mudsuckers for bait from the salt company ponds.

Routine sampling of the six stations of the San Francisco Bay study were carried out. Mr. Walter Schneebeli, collector for the Steinhart Aquarium, accompanied the NAUTILUS cruise on May 20 and gathered a number of specimens. Mrs. P. McMasters of the staff of San Jose State College went out on May 23 collecting invertebrates.

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Extract from the

First Quarterly Report - San Francisco Bay Study

For a minimum study of San Francisco Bay, six sampling stations have been established to measure maximum variation of the environmental conditions which range from essentially ocean water to brackish water, which, in some areas, is highly polluted from industrial and domestic sources. These stations are:

Station No.	Location	Average Depth
1.	1/4 mile south of Redrock	30 ft.
2.	1/2 mile east of northeast corner of Treasure Island	40 ft.
3.	1/4 mile west of northwest corner of Treasure Island	50 ft.
4.	1/4 mile east of radar pylon at north end of San Bruno Shoal	20 ft.
5.	1/2 mile north of No. 2 buoy at entrance to Redwood City Harbor, midway between the centers of the San Mateo and Dumbarton bridges	20 ft.
6.	1/2 mile east of the Dumbarton railroad bridge	20 ft.

Each station will be sampled once each month for the duration of the study. A square mouthed midwater trawl 25 feet on a side is towed for 20 minutes near the surface. The corners of the net are spread by four "doors" about 18 inches square. This net normally has a fifteen foot square fishing spread. The cod end is of 1/2 inch stretched mesh which catches fish as small as one inch long. Fish large enough to avoid this net are to be sampled, starting in June, with recently procured trammel nets of 2 inch mesh. Each station is also sampled by a 15 to 20 minute bottom tow with a beam trawl net 10 feet wide and 4 feet high with 1 inch mesh. This gear collects fish and shellfish living on or near the bottom.

Samples of the bottom with its shallow burrowing fauna are brought up with a 100 cubic inch orange peel dredge. These benthos samples are frozen for later sifting and identification of material. A sample is also taken at each station for Dr. Arnal, San Jose State College, for his study of San Francisco Bay bottom materials. Plankton is taken with a 1/2 meter net of 28 mesh per inch. Each tow is for 20 minutes and the material is preserved for classification by cooperating agencies.

Temperature and salinity measurements are taken by bucket thermometer and hydrometer from both surface and bottom water where the depths are sufficient to make a measurable difference. (Stations 1, 2 and 3). At shallow stations (Nos. 4, 5, and 6) only surface observations are made. Bottom water samples are collected with a modified Eckman bottle secured to the orange peel dredge line two feet above the dredge. Temperature is measured to 0.1^{o}C. and salinity to $0.1^{o}/oo$.

Shore observations are planned at low tides to sample benthic life. Sampling of sloughs will be done by beach seine on outgoing tides and an Eckman dredge will be used from a skiff in shallow water.

Over 15,000 fish of 37 species and several species of crustaceans were taken during February, March, and April. Anchovy, herring, and shiner perch were taken in greatest numbers. Bay shrimp (Crago) have been taken at all stations.

Bottom-dwelling invertebrates are taken incidentally to fish in the beam trawl. These animals and those taken in the bottom samples represent several phyla. The polychaetes, pelecypods, gastropods, and some of the crustacea are elements of the food chain in the bay. It will take much more time and effort to disclose the interrelationships between the many forms of vertebrates and invertebrates.

We do have records, after a few cruises, to show that much of San Francisco Bay is not a biological desert. A biological community exists which represents a tremendous potential for utilization by both sports and commercial interests.

7. BIOLOGICAL NOTES

The second California specimen of Greenland halibut, Reinhardtius hippoglossoides, was presented to Menlo Park Laboratory by Mr. Robert Sallinen of A. Paladini Fish Company, Fort Bragg.

On May 15, an early morning golfer discovered a dead, 37 foot, male sperm whale stranded on a rocky beach next to the 16th green at Cypress Point, 3½ miles south of Monterey Bay. Salinas Tallow Company agreed to process the animal.

In order to remove it Nonella's Tree Service cut the whale into sections with a long chainsaw. Upon cutting, a 170 pound harpoon, with a short section of nylon rope attached, was discovered lodged along the backbone. The harpoon had entered below the eye, and the head had exploded just ahead of the dorsal fin, causing a small rupture in the hide and fracturing some of the vertebrae. A blob of membranous tissue protruded from the rupture in the hide. Measurements were taken of the whale and will be forwarded to the Los Angeles County Museum.

The sperm whale season opened April 1, and the minimum legal limit on these whales is 35 feet. It was judged that this whale had been dead about two weeks.

8. BIOSTATISTICS

A. Data Processing

Regular Reports:
March commercial landing reports were completed.

April cannery and processor reports were tabulated. The monthly tuna letter was prepared and mailed.

April Marine Sport Catch reports were tabulated and the summary letter distributed.

The 1962 annual trawler reports were completed.

Special Reports:
The 1962 Hunter Survey reports were prepared for Game Management.

A report showing the size frequency of registered boats was prepared for the Division of Small Craft Harbors.

The 1962 bluefin length-frequency data were keypunched and summarized for Tuna.

The 1962 landing figures were submitted to California Statistical Abstract.

Work if Progress:
Work is continuing on documenting the Marine Sport Catch editing procedure.

Growth curves of barracuda are being computed for Leo Pinkas using a program written by the Biometrical Analysis Section.

The width-weight relationship of bat rays is being computed for Ed Best. The data are being analyzed on the WDPC 7090 utilizing a length-weight program written by the Biometrical Analysis Section.

Programming of the albacore catch analysis problem is continuing.

May market, cannery and Marine Sport Catch receipts are being edited.

Field:
Field contacts were made at bait shops from Newport Beach to Malibu. Late receipts were picked up and problems with receipts that were received were clarified. Problems included clarification of species, price and condition.

B. Technical Assistance and Biometrical Analysis

Statistical and Mathematical Analysis:
A definitive description of statistical methods used in the southern California pier sampling plan is being written.

Consultations on statistical problems were held with researchers from Inland Fisheries Branch, Salmon Project, and Region V as well as MRO projects.

Computers:
De-bugging continued on the albacore fishing power and pier survey programs. Through-time at Western Data has been very slow and will undoubtedly get worse in June when the computer is going out of operation for a month or more.

9. RESEARCH VESSELS

N.B. SCOFIELD

On the 10th the N.B. SCOFIELD returned to San Pedro from a 30-day blue rockfish study (63-S-3) off central California.

On the 23rd the vessel sailed on her annual albacore exploratory cruise (63-S-4) covering the offshore area of the eastern north Pacific Ocean.

ALASKA

On the 10th the ALASKA sailed from San Pedro for a 23 day Pelagic Fish study off northern California.

NAUTILUS

The NAUTILUS was engaged in 3 weeks of crab, salmon and San Francisco Bay work.

10. MISCELLANEOUS

A. Other Meetings:

May 1 - EDP Managers Conference, Sacramento (Greenhood)

May 14-15 - SCUBA Diving Seminar, Lake Tahoe (Turner, chairman, Odemar, Poole, Bickford and Roedel)

May 16 - Regular Staff Meeting, Sacramento (Roedel)

May 21 - MRO Budget Meeting, CSFL

May 23 - American Statistical Association, SC Chapter (Abramson and Cogswell)

B. Talks:

Yucaipa Shell Club - molluscs (Fitch)

Long Beach area Boy Scout Council - conservation (Gates)

Fremont Junior High Science Club, Seaside - marine animals (Phillips)

Manila Elementary School - commercial fishing (Reed)

Pacifica Elementary School - ocean fishing (Smith)

Scotia Kiwanis Club - oysters (Reed)

C. Personnel:

May 1 - Kenneth D. Aasen, appointed Aquatic Biologist I, Biostatistics

May 1 - John G. Carlisle, Jr., Marine Biologist III, transferred to Special Projects.

May 1 - James Gary Smith, appointed Aquatic Biologist I, Bottomfish.

May 27 - Ralph H. Leisy, appointed Aquatic Biologist I, Pelagic Fish Investigations.

May 31 - Mary Ann Doucette, appointed Intermediate Typist Clerk, Biostatistics.

May 31 - Malcolm S. Oliphant, appointed Aquatic Biologist I, Pelagic Fish Investigations.

May 31 - Barbara L. Short, appointed Junior Stenographer.

Phil M. Roedel
Manager

PMR:md

6-1-63/85